BioSense and PHIN: Architecture Interoperability

David Walker

National Center for Public Health Informatics

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Centers for Disease Control and Prevention





The need for Early Outbreak Detection...

Mystery outbreak's global reach grows

By M.A.J. MCKENNA

appeared to spread to addiconal countries Monday and Liong Kong health authori-cientists at the Centers for ties said confirmed cases Organization ramped up workers. research into possible causes.

New suspected cases were aution said 167 cases of "Se-identified Monday in Austra-ia, England, France, Israel, dreame" have been identified Slovenia and Switzerland.

the total of suspected cases

cases of the illness was taken along with his pregnant wife neumonia that has alarmed oped symptoms. On Monday, authorities said the wife was Ill as well

Disease Control and Preven-tion and the World Health 95, most of them medical

The World Health Organiworldwide, with four deaths In Germany, two women known to have been caused were hospitalized, bringing by the unfamiliar disease.

In southern California, there to four. On Saturday, a state health officials identified Singaporean doctor who a possible case and sent samreated one of the earliest ples to the CDC for testing.



Travelers wear masks to ward off Asia's mystery illness at Hong Kong's Chek Lap Kok airport on Monday

Internationally, tensions INSIDE cased slightly after the government asks.

> Chinese government asks.

the World Health Organization to the bolin double, asks of the bolin double, global health agency about a

> Flease see ILLNESS, A12

pneumonia outbreak four

months ago. A12

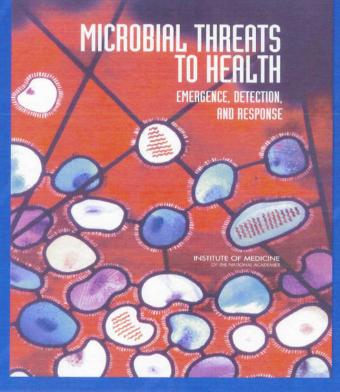
WEST NILE CASES RAISING QUESTIONS **OVER TRANSPLANTS**

NO TEST TO SCREEN BLOOD

Weeks Needed to Determine if Operation or a Transfusion Allowed Transmissions

By LAWRENCE K. ALTMAN

It will take at least two weeks to determine whether the West Nile virus was transmitted through organ transplants or blood transfusions to a cluster of four transplant recipients in whom encephalitis has been diagnosed or suspected, federal health officials said yesterday.



Anthrax Found in NBC News Aide

Suspicious Letter Is Tested at Times - Wide Anxiety

By DAVID BARSTOW

By DAVID BAINSTOW

An assessment to the NSC anchor
form Brokaw has tested produce for
anthrax infection more than two
weeks after she opened a threatening
iterr addressed to Mr. Brokaw that
said yesterday
produce the state of the said yesterday
Even as law enforcement officials
were varioning off Roskefeller Centre, the researcem at The New York
er opened an envelope that also consained a white powder.

The substatic was will being tested have inglin, as investigators oftion in the said of the said of the
maided from St. Petersham, Fla.,
and had similar handwriting, accuration caused widespread anxiety in
New York and arross the country.
Prospie depleted supplies of antihontion of the said of the said of the said of
the a past of threats, and companies
and emergency adjustments to the
form and emergency adjustments to the made emergency adjustments to the way they received mail (Page B9). The NBC case marked the second

the NRC case marked the second time an American has been stricken with a form of anthrax since the sept 11 terror attacks. In the other case, a man died after he contracted an inhaled form of the

disease at a newspaper office in Boca Raton, Fig. Two other people at the office were exposed to anthrax



Mayor Rudolph W. Ginhani after a news conference vesterday at NBC where he tried to caim new fears that were raised by an anthrax case

The New Hork Times

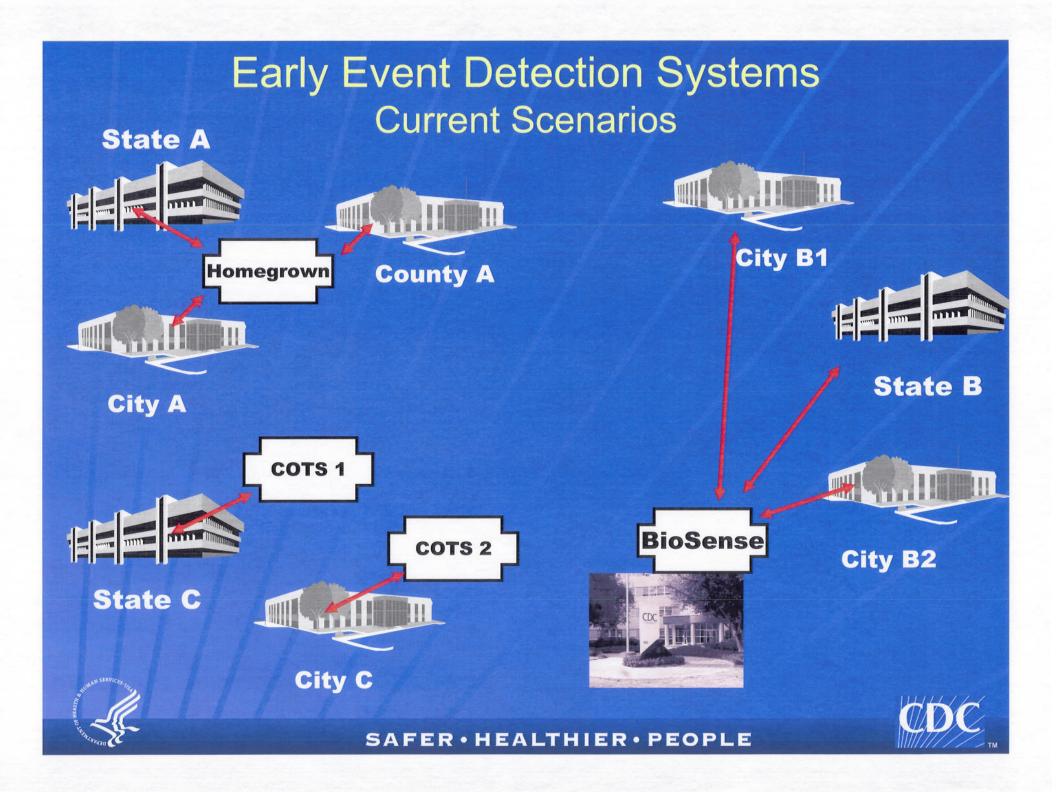
Smallpox Vaccinations Are Urged and Prairie Dogs Are Banned to Halt Monkeypox

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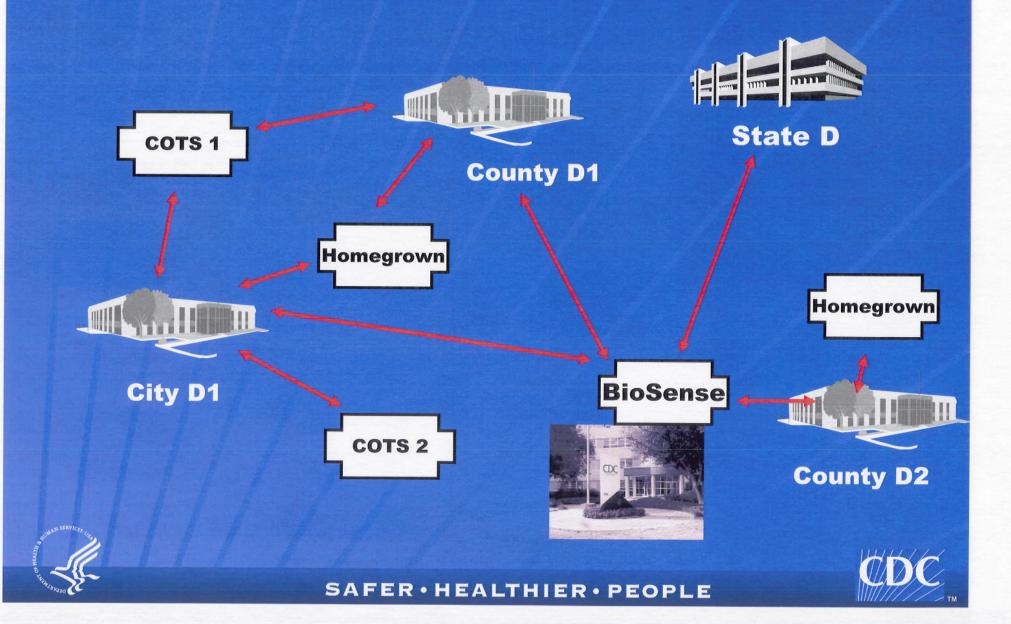
By 1482DCLR ALTIMO

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Early Event Detection Systems Current Scenarios



The Problem...

Because public health outbreaks are not confined to:

- Single jurisdictions
- Single data sources
- Single patterns

Early Event Detection systems should:

- Share data sources
- Interact with outbreak response systems
- Facilitate collaboration for investigation





BioSense and PHIN Interoperability

Interoperability: The ability of two or more systems or components to exchange information and to use the information that has been exchanged. [Institute of Electrical and Electronics Engineers. IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries. New York, NY: 1990]





BioSense and PHIN Interoperability

PHIN Interoperability includes:

Information exchange between system components:

Early Event Detection

Outbreak Management System

Notifiable Disease Systems

Information exchange between data "users":

CDC

State Public Health Departments

City/County Public Health Departments





BioSense and PHIN Interoperability Overview

PHIN Early Event Detection (EED) Component

- EED requirements identified by state/local public health staff
- Relationships between PHIN Components
- Types of data utilized by PHIN components

BioSense as EED Component

- Recent application enhancements to better serve state/local users
- Future enhancements to facilitate interoperability

PHIN Enhancements for Increased Interoperability

- Data "provisioning"
- Additional PHIN components or activities





Public Health Information Network

Early Event Detection BioSense

> Surveillance NEDSS

Secure Communications Epi-X

Analysis & Interpretation BioIntelligence Analytic Technology

Information
Dissemination & KM
CDC Website
Health alerting

PH Response Lab, Outbreak Management, Vaccine administration, etc.



Federal Health
Architecture &
Consolidated
Health Informatics





BioSense and PHIN EED Specifications

Requirements Gathering Process

BioSense requirements gathered in consultations with state/local public health staff

- Initial requirements in Spring 2003
- On-going technical support with users

PHIN "Road Shows" - Regional workshops for state and local public health department staff

- EED sessions in Boston, Chicago, Portland OR, and Las Vegas
- Included input from COTS and "homegrown" system users

PHIN EED specifications intended to:

- Enhance existing systems
- Guidance for new development
- Certification specifications to promote interoperability





PHIN EED Interoperability Requirements State and Local Public Health Perspective

All Early Event Detection Systems should become more interoperable:

- With other PHIN Components
- With other EED or Syndromic Surveillance systems
- · Across all levels of Public Health; Federal, State, and Local

Interoperability capabilities should include:

- Sharing of "raw" or source data
- Secure exchange of investigational information
- Technical support and access to resources





PHIN Component Concept Overview

Countermeasure Response and Administration Connecting Laboratory Systems Partner Communications and Alerting

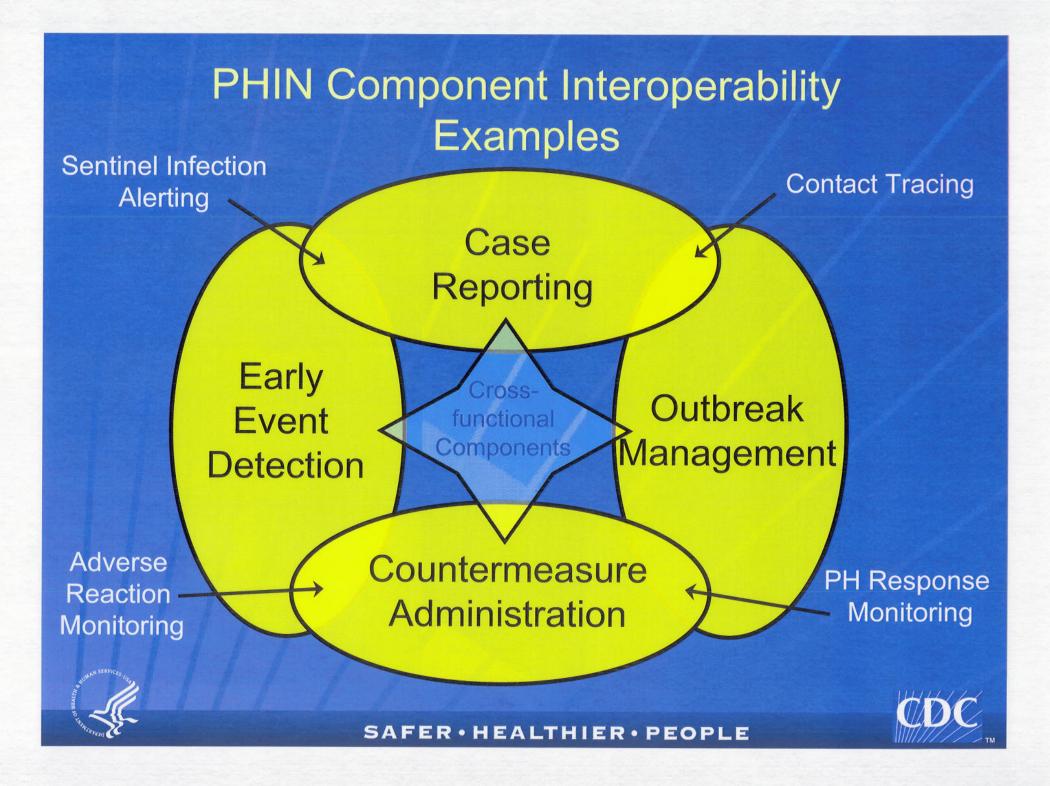
Cross-functional Components

Early Event Detection and Case Reporting

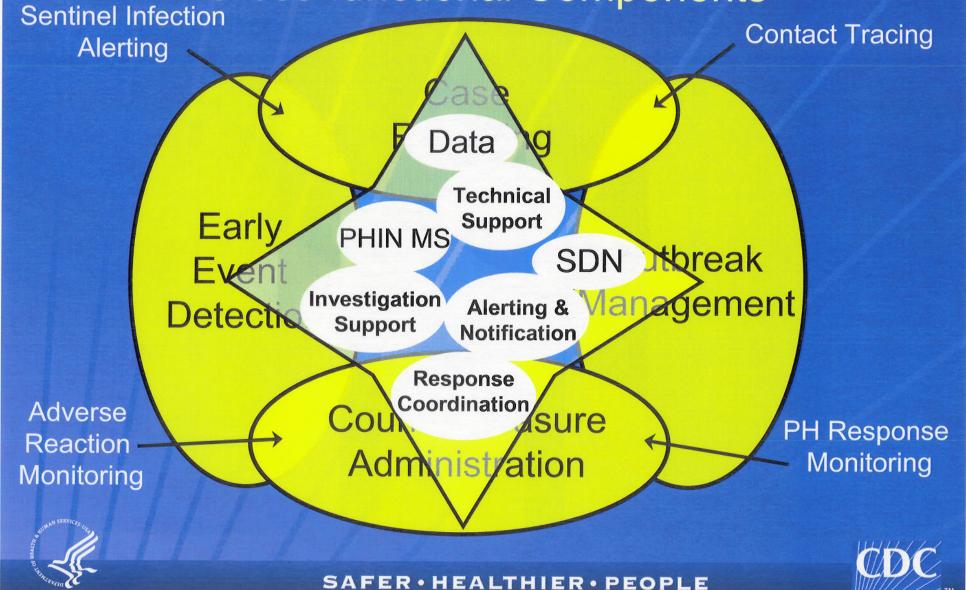
Outbreak Management







PHIN Component Interoperability Cross-functional Components



PHIN Component Interoperability: Data Exchange or Sharing

	PHIN Component					
Data Type	EED	Suspect Case Reporting	NEDSS	OMS	CRA	LRN
"Secondary" Source Patient Data	/	?	?	?		
Clinical Patient Report		\	?	?	?	
Public Health Patient Report			/	1	1	
Environmental Monitoring	/			?		/
"Investigational" Sources	/			?		



Intended Application



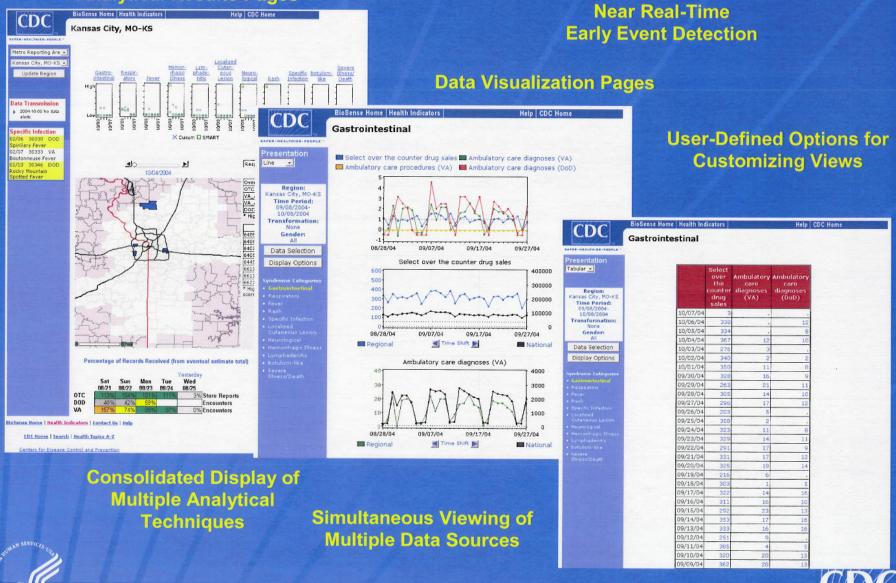
Potential Application





BioSense As EED Component

Analytical Results Pages



BioSense Enhancements for 2005

Analytical Enhancements

- Refinement of current techniques
- Application of Spatial Scanning Technique

Data Visualization Enhancements

- Incorporated BioWatch viewer
- Data Source Users views

Public Health Users Support

- Sentinel Infection Alert Reports
- BioSense Users Working Group

Data Provisioning

- Acquisition of regional and local data sources
- Data distribution to State and Local Public Health EED systems





Future BioSense Enhancements To Facilitate Interoperability

User-Defined settings to allow comparison to other EED systems:

- Custom syndrome binning
- Custom "region" setting
- Custom threshold setting for alerting

"Replay" capability

- Algorithm results history
- Rerun previous time period with "original" or "current" data





PHIN Enhancements To Facilitate Interoperability

Enhanced data availability

- Data acquisition for enhanced EED coverage
- Data exchange between Public Health systems

Enhanced communications capabilities

- PHIN MS adaptation assistance
- Secure communications for information sharing

Enhanced data exchange between PHIN components

- Efficient utilization of "secondary" data
- Develop and enhance investigation and response activities





PHIN Data Exchange

Exit 41

State Health Department PHIN Interchange

Exit 86

Federal Agencies



Exit12

County Health Department

Services Next Exit

EED CRA

OMS NEDSS

DO NOT ENTER





Two

Way Traffic

On Ramp



Data Source



CDC

PHIN EED "Secondary Data" Acquisition Issues to Promote Interoperability

Data source recruitment

- Identification and evaluation
- Data Use Agreement

Technical issues

- PHIN MS implementation
- Record selection interface

Analytical issues

- Data Quality monitoring
- Analysis and investigation support





PHIN EED Data Provisioning Support Activities to Address Data Exchange Issues

Data Provisioning Collaboration

- Data source identification, evaluation, and recruitment
- State/Local Public Health Partner recruitment

PHIN Messaging IT development support

- PHIN MS adaptation assistance
- Data Sources
- Public Health Systems

Secure communications for information sharing

- Investigative reports and processes
- Peer-to-peer communications





In order to support collaborative investigations, and enhance Public Health Response capabilities, PHIN EED "interoperability" advancements should include:

- Query-Back capabilities
- Investigational support database
- BioIntelligence Center Portal





Query-Back Capability

Automated process through PHIN MS to send request to data source for more detail data on specific records.

User interface

- · Identification of records and data elements
- Custom results viewer

Data architecture

- Validation before release to "partner" systems
- Interface with appropriate PHIN components (OMS, NEDSS, etc.)





Investigational Support Database:

Provides for input of investigational findings by public health staff participating in a collaborative investigation or response.

Identifies and links records under investigation

- Across PHIN components
- Across data sources

Interfaces with external systems

- Generates "potential outbreak" summary record for Homeland Security NBIS system notification
- Interfaces with emergency operations center systems





BioIntelligence Center Portal:

Web-based system to allow sharing of reports and access to non-PHIN systems through secure communication channels

Access to "external" information sources

- CDC-based historical surveillance systems
- "Newswire" services

Secure web site with detailed BioSense data

- Sensitive data source information
- EED system user contact information
- Custom reports produced for specific users
- Ad hoc query and analysis capabilities of PHIN data





BioSense and PHIN Interoperability Summary

EED system requirements:

- Input by state/local public health staff
- Define relationships between PHIN Components
- Types of data utilized by PHIN components

BioSense as EED Component

- Recent enhancements to better serve state/local users
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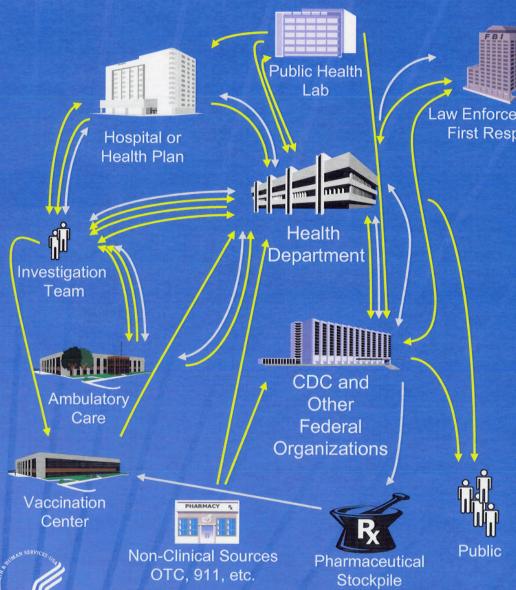
PHIN Enhancements for Increased Interoperability

- Data acquisition and distribution
- Future development to support investigation and response





Early Outbreak Detection Interoperability



PHIN Architecture provides linkages:

aw Enforcement and First Responders

- Across levels of Public Health
- Between Operational Components
- · Between Clinical Care and Public Health
- Between Human Health and animal, plant, and environmental health
- Between Health, Emergency Response, and Law Enforcement entities



Acknowledgments

State and Local Public Health Departments

BioSense user community

Public Health Information Network project staff

EED and "Syndromic Surveillance" collaborators





Additional EED or BioSense Information

BioSense material is available at http://www.cdc.gov/phin/.htm

BioSenseHelp@cdc.gov

Technical support: 1-800-532-9929



